This exam has 2 pages. PLEASE PUT YOUR NAME ON EACH PAGE!
Each question is worth 10 points. There are 120 points possible.

1. Construct an NFA M over the alphabet 0, 1 that accepts exactly those strings which end with 2 or more consecutive 0s. PLEASE USE SOME NONDETERMINISM!

2. Give a regular expression for the language accepted by the machine M above.

3. Using the subset construction, produce a DFA M' that accepts exactly the same language as M.

4. Construct a NFA N over the alphabet 0, 1 that accepts exactly those strings which contain 10 as a substring. PLEASE USE SOME NONDETERMINISM!
5. Give a regular expression for the language accepted by the machine \( N \) above.

6. Using the subset construction, produce a DFA \( N' \) that accepts exactly the same language as \( N \).
7. Using the product construction, construct a DFA that accepts the language L made up of strings accepted by both M and N above. (L = M intersection N)

8. Give a regular expression for the language L.

9. Using the product construction construct a DFA that accepts the language K made up of strings accepted by either M or N or both. (K = M union N).

10. Give a regular expression for K.

    Identify from the list below each (if any) of the regular expressions that generate all and only the strings over alphabet 0, 1 that end in 1:
a) \((0^* + 1)^*(0^* + 1)\)

b) \((0 + 1)^*111^*\)

c) \((0 + 1)^*10^*\)

d) \((0^*1^*)^*1\)